WHAT IS CLAIMED IS:

1. A system for treating the surface of an optical lens, said system comprising:

an entry chamber having a first entrance gate and a first exit gate, said first entrance gate and said first exit gate sealing said entry chamber when closed, and said entry chamber including a conveyor extending between said first entrance gate and said first exit gate;

a first negative pressure source in selective communication with said entry chamber;

a coating chamber having a second entrance gate and a second exit gate, said second entrance gate and said second exit gate sealing said coating chamber when closed, and said coating chamber including at least a pair of spaced apart electrodes disposed therein and a conveyor extending between said second entrance gate and said second exit gate so that said conveyor conveys said lens between said electrodes;

a source of plasma gas in communication with said coating chamber to introduce said gas into said coating chamber;

a second negative pressure source in communication with said coating chamber;

an electrical power source in communication with said electrodes to apply a predetermined electrical potential at each said electrode so that, upon establishment of a predetermined pressure in said coating chamber by said second negative pressure source, a plasma cloud of said gas is established between said electrodes;

an exit chamber having a third entrance gate and a third exit gate, said third entrance gate and said

third exit gate sealing said exit chamber when closed and said exit chamber including a conveyor extending between said third entrance gate and said third exit gate; and

a third negative pressure source in selective communication with said exit chamber,

wherein said entry chamber communicates with said coating chamber through said first exit gate and said second entrance gate so that said entry chamber conveyor and said coating chamber conveyor communicate to pass said lens from said entry chamber to said coating chamber, and

wherein said coating chamber communicates with said exit chamber through said second exit gate and said third entrance gate so that said coating chamber conveyor and said exit chamber conveyor communicate to pass said lens from said coating chamber to said exit chamber.

2. The system as in claim 1, wherein said gas is a plasma polymerizable gas.

3. The system as in claim 1, wherein said entry chamber includes

an entry lock chamber,

an entry hold chamber upstream from said entry lock chamber and in communication with said coating chamber by said first exit gate and said second entrance gate, and

a gate disposed between said entry hold chamber and said entry lock chamber so that said entry lock chamber and said entry hold chamber are sealed from each other when said gate therebetween is closed,

said first negative pressure source is in selective communication with each of said entry lock chamber and said entry hold chamber, and

said system includes a source of plasma gas in communication with said entry hold chamber to introduce said gas into said entry hold chamber.

4. The system as in claim 3, including a vent source in communication with said entry lock chamber to introduce a vent gas therein.

5. The system as in claim 3, including a vent source in communication with said entry hold chamber to introduce a vent gas therein.

6. The system as in claim 1, wherein

said exit chamber includes

an exit hold chamber in communication with said coating chamber by said second exit gate and said third entrance gate,

an exit lock chamber downstream from said exit hold chamber, and

a gate disposed between said exit lock chamber and said exit hold chamber so that said exit hold chamber and said exit lock chamber are sealed from each other when said gate therebetween is closed,

said third negative pressure source is in selective communication with each of said exit lock chamber and said exit hold chamber, and

said system includes a source of plasma gas in communication with said exit hold chamber to introduce said gas into said exit hold chamber.

7. The system as in claim 6, including a vent source in communication with said exit lock chamber to introduce a vent gas therein.

8. The system as in claim 6, including a vent source in communication with said exit hold chamber to introduce a vent gas therein.

9. The system as in claim 1, including

a drying chamber upstream from said entry chamber and in communication with said entry chamber by said first entrance gate, said drying chamber including a conveyor extending between an entrance to said drying chamber and said first entrance gate, and

a gas source in communication with said drying chamber so that said gas source provides a gas having a predetermined relative humidity to an interior area of said drying chamber.

10. The system as in claim 9, wherein said drying chamber includes a series of tandemly arranged subchambers.

11. The system as in claim 1, including a control system in operative communication with said entry chamber conveyor, said coating chamber conveyor, said exit chamber conveyor, said first negative pressure source, said second negative pressure source, said third negative pressure source, said gas source, said first exit gate, said second entrance gate, said second exit gate and said third entrance gate, said control system configured to

activate said second negative pressure source to maintain said predetermined pressure in said coating chamber,

activate said gas source to maintain said gas in said coating chamber,

activate said entry chamber conveyor to move said lens into said entry chamber when said entry chamber is at ambient pressure and said first exit gate is closed,

thereafter, when said first entrance gate is closed, activate said first negative pressure source to bring an area within said entry chamber adjacent said first exit gate to said predetermined pressure,

thereafter open said first exit gate and said second entrance gate and activate said entry chamber conveyor and said coating chamber conveyor to move said lens from said entry chamber into said coating chamber and between said electrodes,

activate said third negative pressure source to bring an area within said exit chamber adjacent said third entrance gate to said predetermined pressure,

thereafter open said second exit gate and said third entrance gate and activate said coating chamber conveyor and said exit chamber conveyor to move said lens from said coating chamber to said exit chamber, and

thereafter close said third entrance gate.

12. The system as in claim 1, including a plurality of said pairs of spaced apart electrodes arranged in tandem in said coating chamber.

13. The system as in claim 12, including a respective said source of plasma gas to introduce said gas into said coating chamber proximate each said pair of said spaced apart electrodes.

14. The system as in claim 12, including a respective said second negative pressure source in communication with said coating chamber proximate each said pair of said spaced apart electrodes.

15. The system as in claim 1, including an entry buffer area upstream from said spaced apart electrodes and an exit buffer area downstream from said spaced apart electrodes.

16. The system as in claim 1, wherein the first exit gate and second entrance gate comprise a single gate and wherein said second exit gate and said third entrance gate comprise a single gate.

17. A system for applying a polymer coating to optical lenses, said system comprising:

an entry chamber having a first entrance gate and a first exit gate, said first entrance gate and said first exit gate sealing said entry chamber when closed, and said entry chamber including a conveyor extending between said first entrance gate and said first exit gate;

a first negative pressure source in selective communication with said entry chamber;

a first source of plasma-polymerizable gas in selective communication with said entry chamber to introduce said gas into a portion of said entry chamber adjacent said first exit gate;

a coating chamber having a second entrance gate and a second exit gate, said second entrance gate and said second exit gate sealing said coating chamber when closed, and said coating chamber including a pair of spaced apart electrodes disposed therein and a conveyor extending between said second entrance gate and said second exit gate so that said conveyor conveys a carrier of said lenses between said electrodes;

a second source of said plasma-polymerizable gas in communication with said coating chamber to introduce said gas into said coating chamber;

a second negative pressure source in communication with said coating chamber;

an electrical power source in communication with said electrodes to apply a predetermined electrical potential at each said electrode so that, upon establishment of a predetermined pressure in said coating chamber by said second negative pressure

source, a plasma polymerization cloud of said gas is established between said electrodes;

an exit chamber having a third entrance gate and a third exit gate, said third entrance gate and said third exit gate sealing said exit chamber when closed and said exit chamber including a conveyor extending between said third entrance gate and said third exit gate;

a third source of said plasma-polymerizable gas in selective communication with said exit chamber to introduce said gas into a portion of said exit chamber adjacent said third entrance gate;

a third negative pressure source in selective communication with said exit chamber,

wherein said entry chamber communicates with said coating chamber through said first exit gate and said second entrance gate so that said entry chamber conveyor and said coating chamber conveyor communicate to pass said lens carrier from said entry chamber to said coating chamber, and

wherein said coating chamber communicates with said exit chamber through said second exit gate and said third entrance gate so that said coating chamber conveyor and said exit chamber conveyor communicate to pass said lens carrier from said coating chamber to said exit chamber; and

a control system in operative communication with said entry chamber conveyor, said coating chamber conveyor, said exit chamber conveyor, said first negative pressure source, said second negative pressure source, said third negative pressure source, said first gas source, said second gas source, said third gas source, said first exit gate, said second

entrance gate, said second exit gate and said third entrance gate, said control system configured to

activate said second negative pressure source to maintain said predetermined pressure in said coating chamber,

activate said second gas source to maintain said gas in said coating chamber,

activate said entry chamber conveyor to move said lens carrier into said entry chamber when said entry chamber is at ambient pressure and said first exit gate is closed,

thereafter, when said first entrance gate is closed, activate said first negative pressure source said first gas source to fill said area adjacent said first exit gate with said gas and to bring said entry chamber adjacent portion to said predetermined pressure,

thereafter open said first exit gate and said second entrance gate and activate said entry chamber conveyor and said coating chamber conveyor to move said lens carrier from said entry chamber into said coating chamber and between said electrodes,

activate said third negative pressure source and said third gas source to fill said exit chamber adjacent portion with said gas and to bring said exit chamber adjacent portion to said predetermined pressure,

thereafter open said second exit gate and said third entrance gate and activate said coating chamber conveyor and said exit chamber conveyor to move said lens carrier from said coating chamber to said exit chamber, and

thereafter close said third entrance gate.

18. The system as in claim 17, including a vent source in communication with said exit chamber to introduce a vent gas therein and wherein said control system is in operative communication with said vent source to introduce said vent gas into said exit chamber to bring a portion of said third exit chamber in which said carrier is disposed to ambient pressure after closing said third entrance gate.

19. A system for applying a polymer coating to optical lenses, said system comprising:

an entry lock chamber having a first gate at an entrance thereto;

an entry hold chamber having a second gate disposed between said entry lock and said entry hold, said first gate and said second gate sealing said entry lock chamber when closed;

a first conveyor disposed in said entry lock chamber and extending between said first gate and said second gate;

an entry buffer chamber having a third gate disposed between said entry hold chamber and said entry buffer chamber, said second gate and said third gate sealing said entry hold chamber when closed;

a second conveyor disposed in said entry hold chamber and extending between said second gate and said third gate;

a coating chamber in open communication with said entry buffer chamber;

an exit buffer chamber in open communication with said coating chamber;

an exit chamber having a fourth gate disposed between said exit buffer and said exit chamber and having a fifth gate at an exit of said exit chamber,

said fourth gate and said fifth gate sealing said exit chamber when closed;

a third conveyor disposed in said entry buffer chamber, said coating chamber and said exit buffer chamber and extending between said third gate and said fourth gate;

a pair of spaced apart electrodes disposed in said coating chamber so that said third conveyor conveys a carrier of said lenses between said electrodes;

an electrical power source in communication with said electrodes to apply a predetermined electrical potential at each said electrode so that, upon establishment of a first predetermined pressure in said second chamber by said coating chamber negative pressure source, a plasma polymerization cloud of said gas is established between said electrodes;

a fourth conveyor disposed in said exit chamber and extending between said fourth gate and said fifth gate;

a respective negative pressure source in communication with each of said entry lock chamber, said entry hold chamber, said entry buffer chamber, said coating chamber, said exit buffer chamber and said exit chamber;

a respective source of plasma-polymerizable gas in selective communication with each of said entry hold chamber, said entry buffer chamber, said coating chamber, said exit buffer chamber and said exit chamber to introduce said polymerizable gas therein;

a first vent source in communication with said entry lock chamber to introduce a vent gas therein; and

a second vent source in communication with said exit hold chamber to introduce a vent gas therein,

wherein said entry lock chamber communicates with said entry hold chamber through said second gate so that said first conveyor and said second conveyor communicate to pass said lens carrier from said entry lock chamber to said entry hold chamber,

wherein said entry hold chamber communicates with said entry buffer chamber through said third gate so that said second conveyor and said third conveyor communicate to pass said lens carrier from said entry hold chamber to said entry buffer chamber, and

wherein said exit buffer chamber communicates with said exit chamber through said fourth gate so that said third conveyor and said fourth conveyor communicate to pass said lens carrier from said exit buffer chamber to said exit chamber.

20. The system as in claim 19, including a control system in operative communication with said first, second, third and fourth conveyors, said respective negative pressure sources, said respective sources of plasma polymerizable gas, said first, second, third and fifth gates and said first and second vent sources, said control system configured to

activate said respective negative pressure sources in communication with said entry buffer chamber, said coating chamber and said exit buffer chamber to maintain said first predetermined pressure therein,

activate said respective source of plasma polymerizable gas to maintain said gas in said entry buffer chamber, said coating chamber and said exit buffer chamber,

activate said first conveyor to move said lens carrier into said entry lock chamber when said entry lock chamber is at ambient pressure and said second gate is closed,

thereafter, when said first gate and said second gate are closed, activate said respective negative pressure source to bring said entry lock to a second predetermined pressure,

activate said respective negative pressure source in communication with said entry hold chamber to bring said entry hold chamber to said second predetermined pressure,

thereafter, when said entry lock chamber and said entry hold chamber are at said second predetermined pressure, open said second gate and activate said first conveyor and said second conveyor to move said carrier from said entry lock chamber to said entry hold chamber,

thereafter, close said second gate and activate said respective source of plasma polymerizable gas in communication with said entry hold chamber to fill said entry hold chamber with said polymerizable gas,

thereafter, when said entry hold chamber is at said first predetermined pressure, open said third gate and activate said second conveyor and said third conveyor to move said lens carrier from said entry hold chamber to said entry buffer chamber,

thereafter, activate said third conveyor to move said lens carrier between said electrodes and to said exit buffer,

after moving said lens carrier from said entry hold chamber to said entry buffer chamber, close said third gate and activate said first vent source to introduce said vent gas into said entry hold chamber,

close said fourth gate and activate said respective negative pressure source and said respective source of plasma polymerizable gas to fill a portion of said exit chamber adjacent said fourth gate with said polymerizable gas and to bring said exit chamber portion to said first predetermined pressure,

when said lens carrier is in said exit buffer chamber, said exit chamber portion is filled with said polymerizable gas, and said exit buffer chamber and said exit chamber portion are at said first predetermined pressure, thereafter open said fourth gate and activate said third conveyor and said fourth conveyor to move said lens carrier from said exit buffer chamber to said exit chamber,

thereafter close said fourth gate and activate said second vent source to introduce said vent gas into a portion of said exit chamber in which said lens is located.

21. The system as in claim 20, including

a drying chamber upstream from said entry lock chamber and in communication with said entry chamber by said first gate, said drying chamber including a conveyor extending between an entrance to said drying chamber and said first gate, and

a gas source in communication with said drying chamber so that said gas source provides a gas having a predetermined relative humidity to an interior area of said drying chamber.

22. The system as in claim 21, wherein said drying chamber includes a series of tandemly arranged subchambers.

23. The system as in claim 19, including a plurality of said pairs of spaced apart electrodes arranged in tandem in said coating chamber.

24. The system as in claim 20, wherein

said exit chamber includes

an exit hold chamber in communication with said exit buffer chamber by said fourth gate,

an exit lock chamber downstream from said exit hold chamber, and

a sixth gate in communication with said control system and disposed between said exit lock chamber and said exit hold chamber so that said exit hold chamber and said exit lock chamber are sealed from each other when said sixth gate is closed,

said system includes a said respective negative pressure source in selective communication with each of said exit lock chamber and said exit hold chamber,

said system includes a said respective source of plasma polymerizable gas in communication with said exit hold chamber to introduce said gas into said exit hold chamber,

said second vent source is in communication with said exit lock chamber, and

said control system is configured to

after said lens carrier is moved from said exit buffer chamber to said exit hold chamber and said fourth gate is closed, activate said respective negative pressure source to remove said polymerizable gas from said exit hold chamber,

activate said respective negative pressure source in communication with said exit lock chamber,

thereafter, when said lens carrier is in said exit hold chamber, said polymerizable gas has been removed from said exit hold chamber and said exit

hold and exit lock chambers are at the same pressure, open said sixth gate and activate said fourth conveyor to move said lens carrier from said exit hold chamber to said exit lock chamber,

thereafter, close said sixth gate, and

thereafter, activate said second vent source to introduce said vent gas into said exit lock chamber and bring said exit lock chamber to ambient pressure.

25. A method for treating the surface of an optical lens, said method comprising the steps of:

(A) providing said optical lens;

(B) providing a coating chamber including a pair of spaced apart electrodes disposed therein;

(C) maintaining a plasma gas in said coating chamber;

(D) maintaining a first predetermined pressure in said coating chamber and a predetermined electric potential at each said electrode so that a plasma cloud of said gas is established between said electrodes;

(E) providing an entry chamber upstream from said coating chamber;

(F) moving said first lens into said entry chamber;

(G) introducing said gas into at least a portion of said entry chamber adjacent said coating chamber and bringing said at least a portion of said entry chamber to said first predetermined pressure;

(H) bringing said entry chamber into communication with said coating chamber;

(I) moving said first lens from said entry chamber into said coating chamber and through said cloud;

(J) providing an exit chamber downstream from said coating chamber;

(K) introducing said gas into at least a portion of said exit chamber adjacent said coating chamber and bringing said at least a portion of said exit chamber to said first predetermined pressure; and

(L) moving said first lens from said coating chamber to said exit chamber.

26. The method as in claim 25, wherein said gas is a plasma polymerizable gas.

27. The method as in claim 25, including, following moving said first lens into said coating chamber in step (I), sealing said entry chamber from said coating chamber, bringing at least a portion of said entry chamber to ambient pressure, bringing a second said lens into said entry chamber, and thereafter performing steps (G) through (L) with respect to said second lens.

28. The method as in claim 25, wherein

step (E) includes providing said entry chamber having an entry lock chamber and an entry hold chamber, said entry hold chamber being in communication with said coating chamber and said entry lock chamber being upstream from and in communication with said entry hold chamber,

step (F) includes moving said first lens into said entry lock chamber,

said method includes, following step (F), the steps

(M) bringing said entry lock chamber and said entry hold chamber to a second predetermined pressure,

(N) bringing said entry lock chamber into communication with said entry hold chamber and moving

said lens from said entry lock chamber into said entry hold chamber, and

(O) sealing said entry hold chamber from said entry lock chamber,

step (G) includes introducing said gas into said entry hold chamber and bringing said entry hold chamber to said first predetermined pressure,

step (H) includes bringing said entry hold chamber into communication with said coating chamber, and

step (I) includes moving said first lens from said entry hold chamber into said coating chamber and through said cloud.

29. The method as in claim 28, wherein said first predetermined pressure and said second predetermined pressure are unequal.

30. The method as in claim 25, wherein step (B) includes providing a plurality of pairs of said spaced apart electrodes tandemly arranged in said coating chamber.

31. The method as in claim 25, wherein

step (J) includes providing said exit chamber having an exit hold chamber and an exit lock chamber, said exit hold chamber being in communication with said coating chamber and said exit lock chamber being downstream from and in communication with said exit hold chamber,

step (K) includes introducing said gas into said exit hold chamber and bringing said exit hold chamber to said first predetermined pressure; and

step (L) includes bringing said exit hold chamber into communication with said coating chamber and moving said first lens into said exit hold chamber, and

said method includes, following step (L), the steps

(M) evacuating said gas from said exit hold chamber,

(N) bringing said exit lock chamber to a pressure equal to the pressure in said exit hold chamber,

(O) bringing said exit hold chamber into communication with said exit lock chamber and moving said lens from said exit hold chamber into said exit lock chamber, and

(P) sealing said exit lock chamber from said exit hold chamber.

32. The method as in claim 25, wherein including, following moving said first lens into said exit chamber in step (L) and moving said second lens into said entry chamber, sealing said exit chamber from said coating chamber, bringing a portion of said exit chamber in which said first lens is located to ambient pressure, opening said coating chamber to said entry chamber, and bringing said second lens into said coating chamber.

33. A method for applying a polymer coating to optical lenses, said method comprising the steps of:

(A) providing said optical lenses on a plurality of carriers;

(B) providing a coating chamber including a plurality of pairs of spaced apart electrodes disposed in tandem therein;

(C) maintaining a plasma polymerizable gas in said coating chamber;

(D) maintaining a first predetermined pressure in said coating chamber and a predetermined electric potential at each said electrode so that a plasma

polymerization cloud of said gas is established between said electrodes in each said pair of electrodes;

(E) providing an entry hold chamber upstream from said coating chamber;

(F) providing an entry lock chamber upstream from said entry hold chamber;

(G) moving a first said carrier into said entry lock chamber;

(H) sealing said entry lock chamber and thereafter bringing said entry lock chamber to a second predetermined pressure;

(I) bringing said entry hold chamber to said second predetermined pressure;

(J) opening said entry hold chamber to said entry lock chamber and moving said first carrier from said entry lock chamber into said entry hold chamber;

(K) following step (J), sealing said entry hold chamber from said entry lock chamber, introducing said gas into said entry hold chamber and bringing said entry hold chamber to said first predetermined pressure;

(L) following step (J), bringing said entry lock chamber to ambient pressure, bringing a second said carrier into said entry lock, and repeating said method beginning at step (H) with respect to said second carrier and for a desired number of subsequent said carriers;

(M) following step (K), opening said coating chamber to said entry hold chamber and moving said first carrier into said coating chamber and through said plasma clouds;

(N) after said first carrier is removed from said entry hold chamber in step (M), sealing said

entry hold from said coating chamber and said entry lock chamber and returning to step (I) with respect to said second carrier

(O) providing an exit chamber downstream from said coating chamber;

(P) introducing said gas into at least a portion of said exit chamber adjacent said coating chamber and bringing said at least a portion of said exit chamber to said predetermined pressure; and

(Q) moving said first carrier from said coating chamber to said exit chamber.

34. A system for treating the surface of an optical lens, said system comprising:

an entry chamber having a first entrance gate and a first exit gate, said first entrance gate and said first exit gate sealing said entry chamber when closed, and said entry chamber including means for conveying said lens between said first entrance gate and said first exit gate;

means for selectively applying negative pressure to said entry chamber;

a coating chamber having a second entrance gate and a second exit gate, said second entrance gate and said second exit gate sealing said coating chamber when closed;

means for introducing a plasma gas into said coating chamber;

means for applying negative pressure to said coating chamber;

means for maintaining a plasma cloud of said gas in said coating chamber;

means for conveying said lens through said cloud;

an exit chamber having a third entrance gate and a third exit gate, said third entrance gate and said

third exit gate sealing said exit chamber when closed and said exit chamber including a means for conveying said lens between said third entrance gate and said third exit gate; and

means for selectively applying negative pressure to said exit chamber,

wherein said entry chamber communicates with said coating chamber through said first exit gate and said second entrance gate so that said entry chamber conveying means and said coating chamber conveying means communicate to pass said lens from said entry chamber to said coating chamber, and

wherein said coating chamber communicates with said exit chamber through said second exit gate and said third entrance gate so that said coating chamber conveying means and said exit chamber conveying means communicate to pass said lens from said coating chamber to said exit chamber.

35. A continuous method for treating the surface of optical lenses, said method comprising the steps of:

(A) providing said optical lenses in batches,

(B) providing a coating chamber including a pair of spaced apart electrodes disposed therein, and

(C) maintaining a plasma gas in said coating chamber,

wherein said plasma gas is continuously maintained in said coating chamber between said batches, and said plasma gas produced from a process gas containing oxygen.

36. A system for treating the surface of an optical lens, said system comprising:

an entry chamber;

a coating chamber downstream from said entry chamber and including a pair of spaced apart electrodes disposed therein;

an exit chamber downstream from said coating chamber;

a conveyor extending through said entry chamber, said coating chamber and said exit chamber so that said conveyor conveys said lens between said electrodes;

a source of plasma gas in communication with said coating chamber to introduce said gas into said coating chamber;

a negative pressure source in communication with said entry chamber, said coating chamber and said exit chamber;

an electrical power source in communication with said electrodes so that, upon introduction of said gas in said coating chamber by said gas source and upon establishment of a predetermined pressure in said coating chamber by said negative pressure source and of a predetermined potential at each said electrode, a plasma cloud of said gas is established between said electrodes; and

a control system in communication with said negative pressure source, said entry chamber, said coating chamber, said exit chamber and said conveyor, said control system configured to move said lens through each said chamber by said conveyor, to selectively seal said entry chamber from said coating chamber and said exit chamber from said coating chamber and to selectively pressurize and depressurize said entry chamber and said exit chamber.